TOPIC: Jump Starting Vehicles

TIME FRAME: :20

LEVEL OF INSTRUCTION: Level I

BEHAVIORAL OBJECTIVE:

Condition: A written quiz

Behavior: The student will list and describe the proper procedure for jump starting vehicles.

Standard: With a minimum of 80% accuracy

MATERIALS NEEDED:

- Jumper cables
- Batteries or simulated batteries
- Visual aids
- White board, erasable markers
- Audio visual equipment

REFERENCES:

- CAL FIRE, Mobile Equipment Management Procedures Handbook, (6700)

PREPARATION: As with any automotive batteries on firefighting apparatus, they may lose their charge over time and may require a "jump-start". There is a safe procedure for “jump starting” such vehicles without inflicting personal injury or mechanical damage.

PRESENTATION	APPLICATION
I. TERMINOLOGY	Information sheet #1
A. Jumper Cables 1. Constructed of two prefabricated insulated cables with a spring like ”alligator” type clamp on each end 2. The cables and or clamps are generally color coded to designate whether they should be attached to the negative or positive terminals a. Red positive cables are common b. Black negative cables are common	
B. Batteries 1. Come in differing sizes and differing groups depending on the intended use and cranking power requirements 2. Battery terminal a. Positive terminal (1) Larger in diameter (2) Stamped or marked with "**+**" (3) May have a PVC cover to inhibit corrosion b. Negative terminal (1) Smaller diameter (2) Stamped or marked with "**-**" c. Terminal location (1) Top mounted (2) Side mounted	
II. JUMP STARTING PROCEDURE	Information sheet #2
A. Position vehicles so cables will reach batteries of both vehicles	

PRESENTATION	APPLICATION
1. Do not allow vehicles to touch 2. Motors should be off on both vehicles 3. Transmission must be in "park" or "neutral" 4. Parking brakes must be applied 5. Chock blocks should be set if so equipped 6. Turn off all lights and accessories	
B. Connect jumper cables	Do not allow clamps to touch each other or any metal object while attached to a battery
1. Clamp one end of the positive (**+**) cable to the positive (**+)** terminal of discharged battery 2. Clamp the opposite end of the positive (**+**) cable to the positive (**+)** terminal of the charged battery 3. Clamp one end of the negative (**-**) cable to the negative (**-**) terminal of the "charged" battery 4. Clamp the opposite end of the negative (**-**) cable to a ground source on the vehicle with the discharged battery a. Grounding source must be 18" from the battery b. Good grounds include heavy bracket, bolts on the engine block and frame members. 5. Ensure that cables and tools are clear of all parts which will move when engine starts 6. Start the motor of the vehicle with the good battery and run at moderate speed 7. Start the engine on the vehicle with the discharged battery a. If engine does not start, check and secure all clamp connections	

PRESENTATION	APPLICATION

C. Removal sequence reverses the connection sequence

1. Remove negative (**-**) cable clamp from frame or other ground source on vehicle with the previously "discharged" battery
2. Remove negative cable clamp from negative terminal on vehicle with the "charged" battery
3. Remove positive cable clamp from the positive terminal of the previously "charged" battery
4. Remove the positive cable (**+**) clamp from the positive terminal of the previously "discharged" battery
   a. Do not allow clamps to touch each other or other metal objects during removal sequence.

III. SAFETY PRECAUTIONS

A. Always wear eye protection and gloves

B. Do not lean over battery

C. Avoid skin contact with battery acid

D. Do not overheat battery by continuous cranking

E. Do not jump batteries which are mismatched as to size and/or group

F. Do not allow clamps to contact each other or metal parts while attached to a battery

1. Arcing may cause explosion

G. Batteries produce poisonous gases which should not be inhaled or subjected to open flame

H. Do not stand between vehicles. Starter may accidentally crank over causing vehicle to lurch forward.

SUMMARY:

It is not uncommon within the scope of your employment as a firefighter to encounter "discharged" vehicle batteries. Jump starting these batteries is a relatively simple process if basic rules are followed. Failure to take the proper steps may result in a serious injury.

EVALUATION:

A written quiz.

ASSIGNMENT:

To be determined by instructor(s).